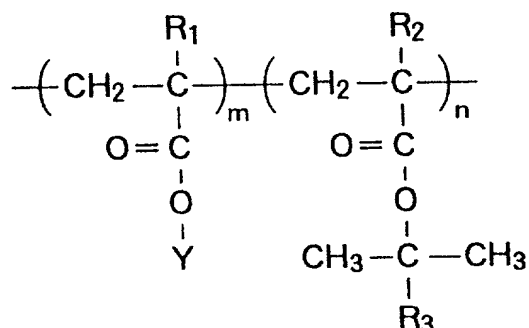


WHAT IS CLAIMED IS

1. A radiation sensitive material comprising: a copolymer expressed by a general formula



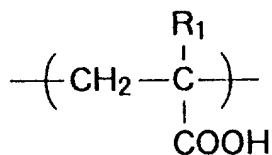
(where Y represents alicyclic group; R₁ and R₂ represent CH₃ or H, and at least one of R₁ and R₂ is H; and R₃ represents alkyl group); and

a substance generating an acid by application of radiation.

2. A radiation sensitive material according to claim 1, wherein the copolymer includes, by 40 - 70 mol%, a unit structure including alicyclic groups.

3. A radiation sensitive material comprising:

a copolymer including a unit structure which is expressed by a general formula

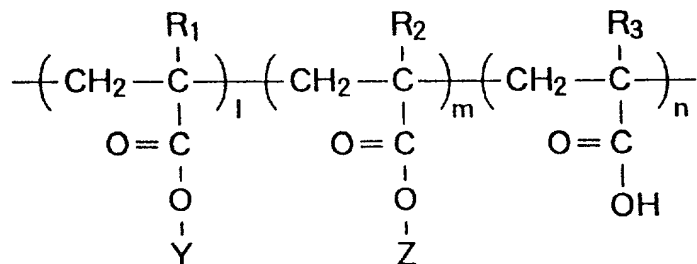


(where R₁ represents CH₃ or H)

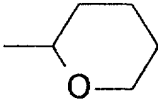
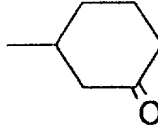
and which generates an alkali soluble group in the presence of methacrylic acid or acrylic acid, and an acid; and

a substance generating an acid by application of radiation.

4. A radiation sensitive material comprising:
a terpolymer expressed by a general formula



(where Y represents alicyclic group;

Z represents $-\text{C}(\text{CH}_3)_2\text{R}_4$, , or  ;

R_1 , R_2 , and R_3 represent CH_3 or H; and R_4 represents alkyl group); and

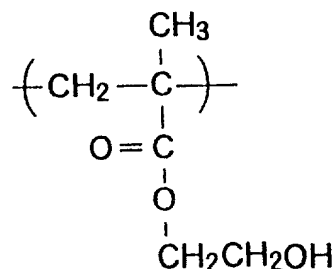
a substance generating an acid by application of radiation.

5. A radiation sensitive material according to claim 3, wherein the copolymer includes the unit structure having carboxylic acid by above 5 mol% and below 35 mol%.

6. A radiation sensitive material according to claim 4, wherein the copolymer includes the unit structure having carboxylic acid by above 5 mol% and below 35 mol%.

7. A radiation sensitive material comprising:

a copolymer including a unit structure which is expressed by a general formula

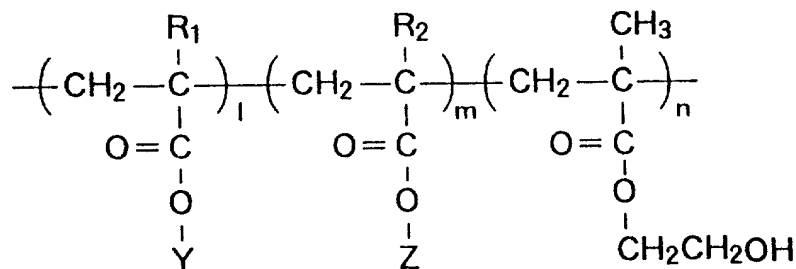


and which generates an alkali soluble group in the presence of methacrylic acid and an acid; and

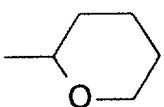
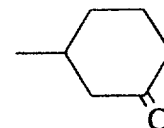
a substance generating an acid by application of radiation.

8. A radiation sensitive material comprising:

a terpolymer expressed by a general formula



(where Y represents alicyclic group; and

Z represents $-\text{C}(\text{CH}_3)_2\text{R}_4$, , or  ;

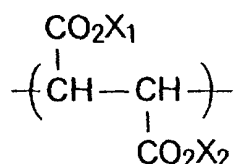
R_1 and R_2 represent CH_3 or H ; and R_3 represents alkyl group); and

a substance generating an acid by application of radiation.

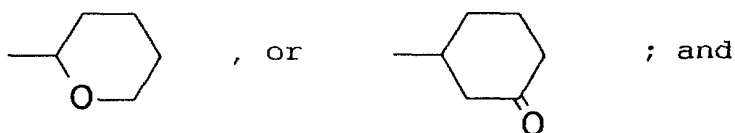
9. A radiation sensitive material according to claim 7, wherein the copolymer includes the hydroxyethyl methacrylate by above 5 mol%.

10. A radiation sensitive material according to claim 8, wherein the copolymer includes the hydroxyethyl methacrylate by above 5 mol%.

11. A radiation sensitive material comprising:
a copolymer including a unit structure expressed by



(where X_1 and X_2 represent $-\text{C}(\text{CH}_3)_2\text{R}_1$,

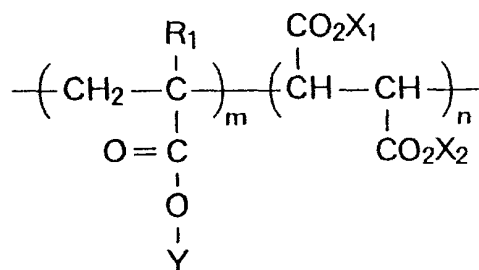


R_1 represents alkyl group); and

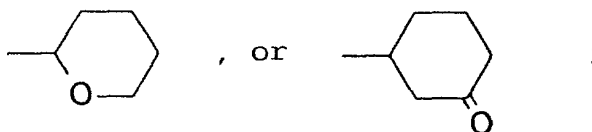
a unit structure generating an alkali soluble group in the presence of an acid; and

a substance generating acid by application of radiation.

12. A radiation sensitive material comprising:
a copolymer expressed by a general formula



(where X_1 and X_2 represent $-C(CH_3)_2R_2$,

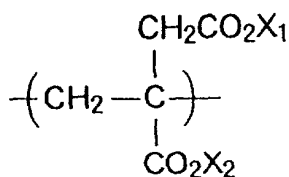


Y represents alicyclic group; R_1 represent CH_3 or H; and R_2 represents alkyl group); and

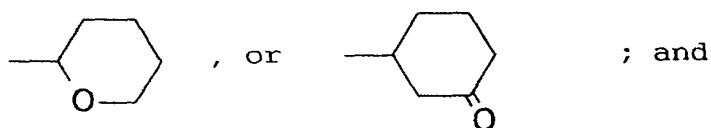
a substance generating an acid by application of radiation.

13. A radiation sensitive material comprising:

a copolymer including a unit structure expressed by



(where X_1 and X_2 represent $-C(CH_3)_2R_1$,



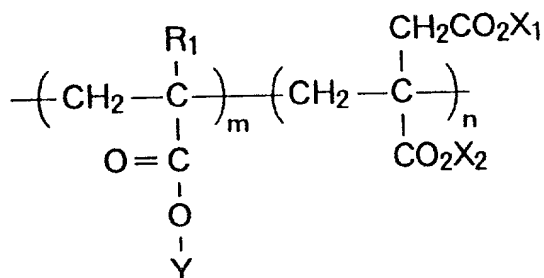
R_1 represents alkyl group); and

a unit structure generating an alkali soluble group in the presence of an acid; and

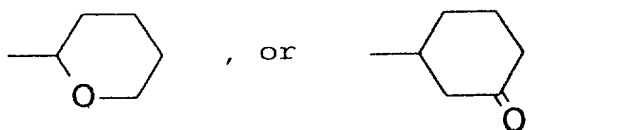
a substance generating an acid by application of radiation.

14. A radiation sensitive material comprising:

a copolymer expressed by a general formula



(where X_1 and X_2 represent $-\text{C}(\text{CH}_3)_2\text{R}_2$,

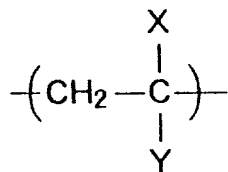


Y represents alicyclic group; R_1 represent CH_3 or H ; and R_2 represents alkyl group); and

a substance generating an acid by application of radiation.

15. A radiation sensitive material comprising:

a copolymer including a unit structure expressed by a general formula



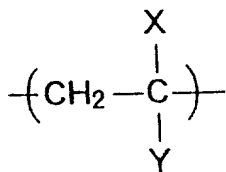
(where at least one of X or Y is a nitrile group)
and a unit structure generating an alkali soluble group;
and

a substance generating an acid by application of radiation.

16. A radiation sensitive material according to claim 15, wherein the copolymer includes t-butyl groups.

17. A radiation sensitive material according to claim 15, wherein the copolymer includes alicyclic groups.

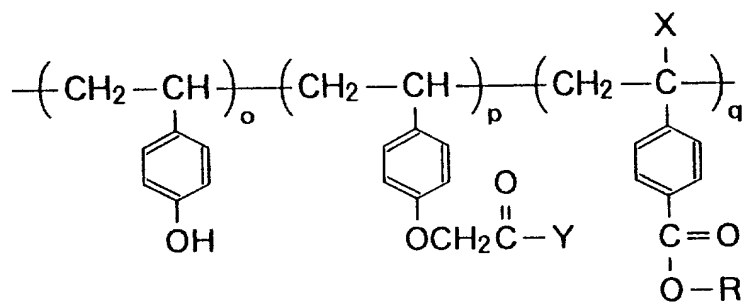
18. A radiation sensitive material according to claim 15, wherein the unit structure



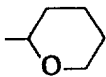
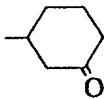
(where at least one of X or Y is a nitrile group) is acrylonitrile or methacrylonitrile.

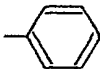
19. A radiation sensitive material according to claim 18, wherein the copolymer includes the acrylonitrile or methacrylonitrile by 10 - 70 mol%.

20. A radiation sensitive material comprising a terpolymer expressed by a general formula

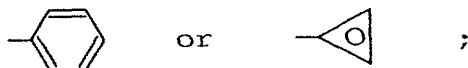


(where X represents H or CH₃;

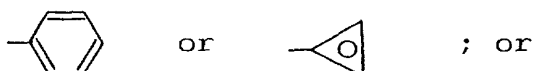
R represents  ,  or $\begin{array}{c} \text{R}_1 \\ | \\ \text{---C---R}_3 \\ | \\ \text{R}_2 \end{array}$; and

R₁ and R₂ represent H, R₃ represents  ;

R₁ represents CH₃, R₂ represents H, R₃ represents



R₁ and R₂ represent CH₃, R₃ represents



R₁ , R₂ and R₃ represent CH₃); and

a substance generating an acid by application of radiation.

21. A radiation sensitive material comprising:

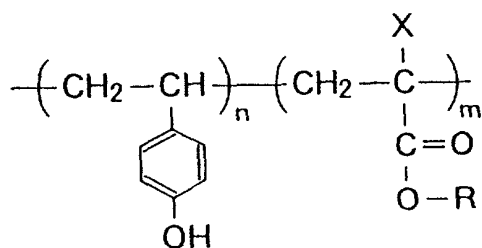
a resist containing a hydrophilic group; and

a hydrophobic compound.

22. A radiation sensitive material according to claim

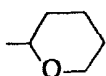
21, wherein

the resist containing a hydrophilic group is a copolymer expressed by a general formula

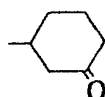


(where X represents H or CH₃;

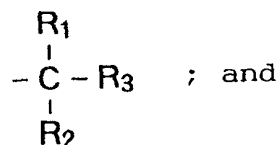
R represents

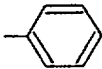


,

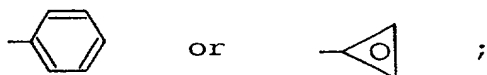


or



R₁ and R₂ represent H, R₃ represents  ;

R₁ represents CH₃, R₂ represents H, R₃ represents



R₁ and R₂ represent CH₃, R₃ represents



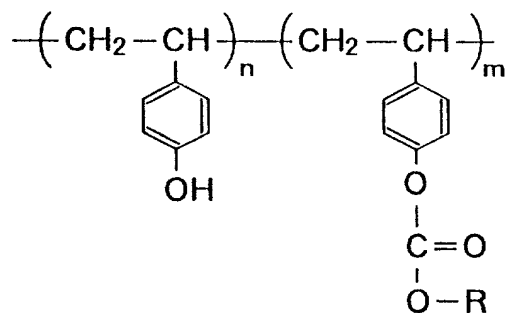
R₁ , R₂ and R₃ represent CH₃).

23. A radiation sensitive material according to claim 22, wherein

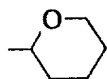
vinylphenol of the resist containing hydrophilic groups is contained by 50 - 70 mol%.

24. A radiation sensitive material according to claim 21, wherein

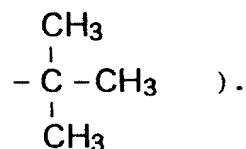
the resist containing hydrophilic groups is a copolymer expressed by a general formula



(where R represents

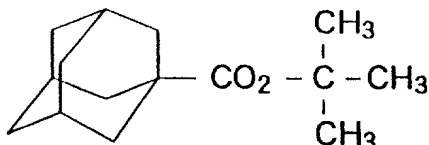


or

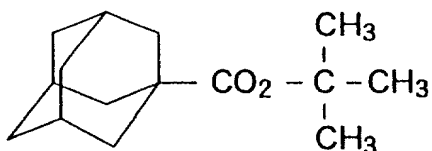


25. A radiation sensitive material according to claim 24, wherein vinylphenol in the resist containing the hydrophilic group is contained 60 - 80 mol%.

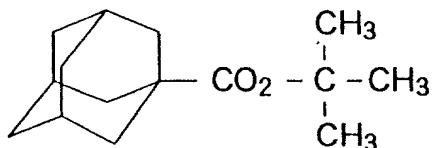
26. A radiation sensitive material according to claim 21, wherein
the hydrophobic compound is expressed by



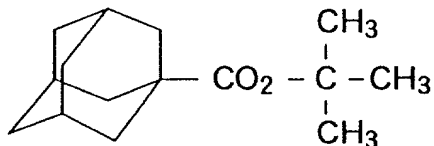
27. A radiation sensitive material according to claim 22, wherein
the hydrophobic compound is expressed by



28. A radiation sensitive material according to claim 23, wherein
the hydrophobic compound is expressed by

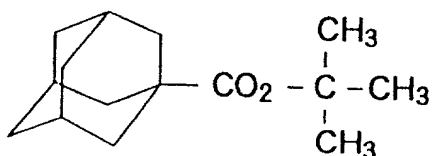


29. A radiation sensitive material according to claim 24, wherein
the hydrophobic compound is expressed by



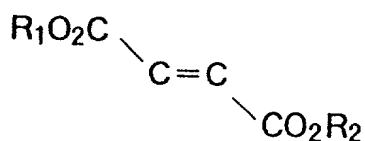
30. A radiation sensitive material according to claim 25, wherein

the hydrophobic compound is expressed by

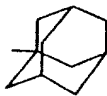
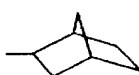


31. A radiation sensitive material according to claim 21, wherein

the hydrophobic compound is expressed by a general formula

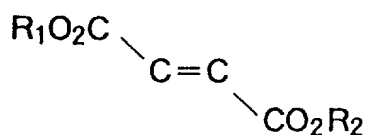


(where R_1 and R_2 represent $-\text{C}(\text{CH}_3)_3$; or


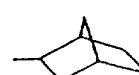
R_1 represents  or  , R_2 represents $-\text{C}(\text{CH}_3)_3$).

32. A radiation sensitive material according to claim 22, wherein

the hydrophobic compound is expressed by a general formula

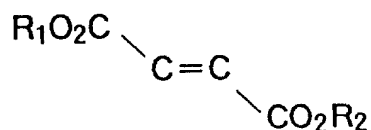


(where R_1 and R_2 represent $-\text{C}(\text{CH}_3)_3$; or

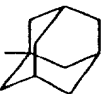
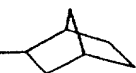
R_1 represents  or  , R_2 represents $-\text{C}(\text{CH}_3)_3$).

33. A radiation sensitive material according to claim 23, wherein

the hydrophobic compound is expressed by a general formula

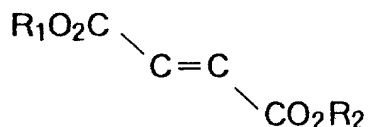


(where R_1 and R_2 represent $\begin{array}{c} \text{CH}_3 \\ | \\ -\text{C}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$; or

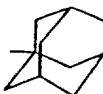
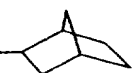
R_1 represents  or  , R_2 represents $\begin{array}{c} \text{CH}_3 \\ | \\ -\text{C}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$).

34. A radiation sensitive material according to claim 24, wherein

the hydrophobic compound is expressed by a general formula



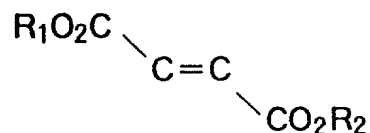
(where R_1 and R_2 represent $\begin{array}{c} \text{CH}_3 \\ | \\ -\text{C}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$; or

R_1 represents  or  , R_2 represents $\begin{array}{c} \text{CH}_3 \\ | \\ -\text{C}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$).


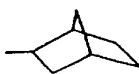
35. A radiation sensitive material according to claim 25, wherein

the hydrophobic compound is expressed by a general

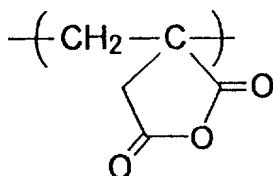
formula



(where R_1 and R_2 represent $\begin{array}{c} \text{CH}_3 \\ | \\ -\text{C}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$; or

R_1 represents  or  , R_2 represents $\begin{array}{c} \text{CH}_3 \\ | \\ -\text{C}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$).

36. A radiation sensitive material comprising:
a copolymer including itaconic anhydride which is expressed by

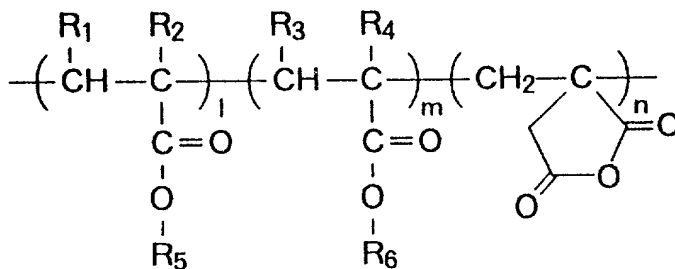


and a polymer as a unit structure which generates an alkali soluble group in the presence of an acid; and

a substance generating an acid by application of radiation.

37. A radiation sensitive material according to claim 36, wherein

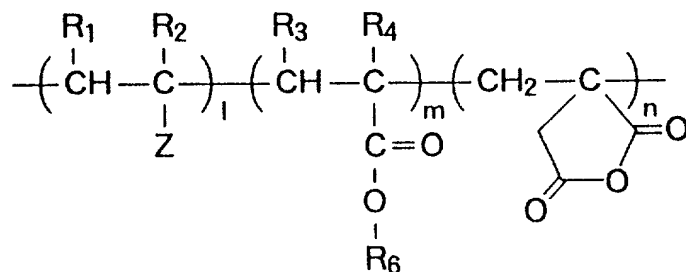
the copolymer is expressed by a general formula



(where 1, m and n represent 0 - 60 mol%, 10 - 95 mol%, 5 - 50 mol% respectively; R_1 , R_2 , R_3 and R_4 represent H, halogen, C_{1-4} alkyl group, C_{1-4} substituted alkyl group, nitrile group, $-(CH_2)_nCOOR_5$ ($n=0-1$) or $-(CH_2)_nCOOR_6$ ($n=0-1$); R_5 represents C_{1-5} alkyl group, C_{1-5} substituted alkyl group, alicyclic group, substituted alicyclic group, aromatic group or substituted aromatic group; and R_6 represents t-butyl group, t-amyl group, dimethylbenzyl group, tetrahydropyranyl group or 3-oxocyclohexyl group).

38. A radiation sensitive material according to claim 36, wherein

the copolymer is expressed by

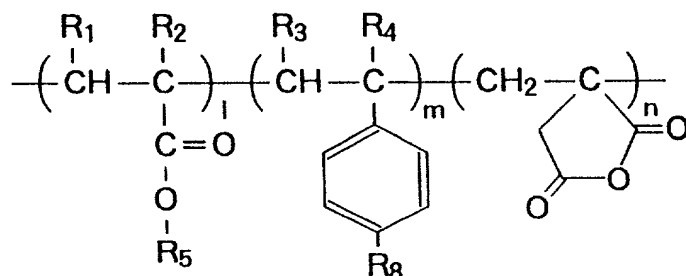


(where 1, m and n represent 1 - 95 mol%, 10 - 95 mol% and 5 - 50 mol%; Z represents benzene ring, substituted benzene ring, nitrile group, $-OR_7$, $-COR_7$ or $-OCOR_7$; R_1 , R_2 , R_3 and R_4 represent H, halogen, C_{1-4} alkyl group, C_{1-4} substituted alkyl group, nitrile group, $-C(CH_2)_nCOOR_5$ ($n=0-1$), or $-(CH_2)_nCOOR_6$ ($n=0-1$); R_6 represents t-butyl group, t-amyl group, dimethylbenzyl group, tetrahydropyranyl group or 3-oxocyclohexyl group; R_7 represents C_{1-5} alkyl group, C_{1-5} substituted alkyl group, alicyclic group, substituted alicyclic group, aromatic group or substituted aromatic group).

39. A radiation sensitive material according to claim

36, wherein

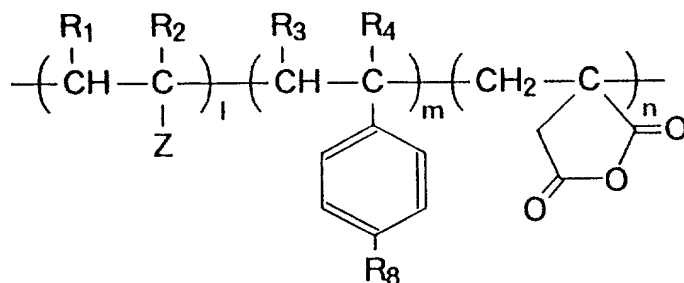
the copolymer is expressed by a general formula



(where 1, m and n represent 0 - 95 mol%, 1 - 95 mol% and 5 - 50 mol%; R₁, R₂, R₃ and R₄ represent H, halogen, C₁₋₄ alkyl group, C₁₋₄ substituted alkyl group, nitrile group, -(CH₂)_nCOOR₅ (n=0-1) or -(CH₂)_nCOOR₆ (n=0-1); R₅ represents C₁₋₅ alkyl group, C₁₋₅ substituted alkyl group, alicyclic group, substituted alicyclic group, aromatic group or substituted aromatic group; and R₈ represents -OtBu, -OCO₂tBu or -CO₂t-Amyl).

40. A radiation sensitive material according to claim 36, wherein

the copolymer is expressed by a general formula



(where 1, m and n represent 0 - 95 mol%, 1 - 95 mol% and 5 - 50 mol%; Z represents benzene ring, substituted benzene ring, nitrile group, OR₇, -COR₇ or -OCOR₇; R₁, R₂, R₃ and R₄

represent H, halogen, C₁₋₄ alkyl group, C₁₋₄ substituted alkyl group, nitrile group, -(CH₂)_nCOOR₅(n=0-1) or -(CH₂)_nCOOR₆(n=0-1); and R₈ represents -OtBu, -OCOOtBu, or -COOt-Amyl).

41. A radiation sensitive material according to claim 36, wherein

the copolymer includes the unit structure including the itaconic anhydride by 5 - 50 mol%.

42. A radiation sensitive material according to claim 37, wherein

the copolymer includes the unit structure including the itaconic anhydride by 5 - 50 mol%.

43. A radiation sensitive material according to claim 38, wherein

the copolymer includes the unit structure including the itaconic anhydride by 5 - 50 mol%.

44. A radiation sensitive material according to claim 39, wherein

the copolymer includes the unit structure including the itaconic anhydride by 5 - 50 mol%.

45. A radiation sensitive material according to claim 40, wherein

the copolymer includes the unit structure including the itaconic anhydride by 5 - 50 mol%.

46. A method for forming a pattern comprising the steps of:

preparing a resist of a radiation sensitive material according to claim 1;

applying the resist to a substrate to be processed;

prebaking the substrate and then selectively exposing the resist on the substrate to radiation; and

postbaking the substrate, and then developing the resist on the substrate to form the pattern.

47. A method for forming a pattern comprising the

steps of:

preparing a resist of a radiation sensitive material according to claim 3;

applying the resist to a substrate to be processed;

prebaking the substrate and then selectively exposing the resist on the substrate to radiation; and

postbaking the substrate, and then developing the resist on the substrate to form the pattern.

48. A method for forming a pattern comprising the steps of:

preparing a resist of a radiation sensitive material according to claim 4;

applying the resist to a substrate to be processed;

prebaking the substrate and then selectively exposing the resist on the substrate to radiation; and

postbaking the substrate, and then developing the resist on the substrate to form the pattern.

49. A method for forming a pattern comprising the steps of:

preparing a resist of a radiation sensitive material according to claim 7;

applying the resist to a substrate to be processed;

prebaking the substrate and then selectively exposing the resist on the substrate to radiation; and

postbaking the substrate, and then developing the resist on the substrate to form the pattern.

50. A method for forming a pattern comprising the steps of:

preparing a resist of a radiation sensitive material according to claim 8;

applying the resist to a substrate to be processed;

prebaking the substrate and then selectively exposing the resist on the substrate to radiation; and

postbaking the substrate, and then developing the

resist on the substrate to form the pattern.

51. A method for forming a pattern comprising the steps of:

preparing a resist of a radiation sensitive material according to claim 11;

applying the resist to a substrate to be processed;

prebaking the substrate and then selectively exposing the resist on the substrate to radiation; and

postbaking the substrate, and then developing the resist on the substrate to form the pattern.

52. A method for forming a pattern comprising the steps of:

preparing a resist of a radiation sensitive material according to claim 12;

applying the resist to a substrate to be processed;

prebaking the substrate and then selectively exposing the resist on the substrate to radiation; and

postbaking the substrate, and then developing the resist on the substrate to form the pattern.

53. A method for forming a pattern comprising the steps of:

preparing a resist of a radiation sensitive material according to claim 13;

applying the resist to a substrate to be processed;

prebaking the substrate and then selectively exposing the resist on the substrate to radiation; and

postbaking the substrate, and then developing the resist on the substrate to form the pattern.

54. A method for forming a pattern comprising the steps of:

preparing a resist of a radiation sensitive material according to claim 14;

applying the resist to a substrate to be processed;

prebaking the substrate and then selectively exposing

the resist on the substrate to radiation; and

postbaking the substrate, and then developing the resist on the substrate to form the pattern.

55. A method for forming a pattern comprising the steps of:

preparing a resist of a radiation sensitive material according to claim 15;

applying the resist to a substrate to be processed;

prebaking the substrate and then selectively exposing the resist on the substrate to radiation; and

postbaking the substrate, and then developing the resist on the substrate to form the pattern.

56. A method for forming a pattern comprising the steps of:

preparing a resist of a radiation sensitive material according to claim 20;

applying the resist to a substrate to be processed;

prebaking the substrate and then selectively exposing the resist on the substrate to radiation; and

postbaking the substrate, and then developing the resist on the substrate to form the pattern.

57. A method for forming a pattern comprising the steps of:

preparing a resist of a radiation sensitive material according to claim 21;

applying the resist to a substrate to be processed;

prebaking the substrate and then selectively exposing the resist on the substrate to radiation; and

postbaking the substrate, and then developing the resist on the substrate to form the pattern.

58. A method for forming a pattern comprising the steps of:

preparing a resist of a radiation sensitive material according to claim 36;

applying the resist to a substrate to be processed;
prebaking the substrate and then selectively exposing
the resist on the substrate to radiation; and
postbaking the substrate, and then developing the
resist on the substrate to form the pattern.

59. A method for forming a pattern comprising the
steps of:

preparing a resist of a radiation sensitive material;
applying the resist to a substrate to be processed;
prebaking the substrate and then selectively exposing
the resist on the substrate to radiation; and
postbaking the substrate, and then developing the
resist on the substrate by a developer being a mixed liquid
of an organic alkaline aqueous solution and isopropyl
alcohol to form the pattern.

60. A method for forming a pattern according to claim
59, wherein the developer contains the isopropyl alcohol by
5 - 95 vol%.

61. A method for forming a pattern comprising the
steps of:

preparing a resist of a polymer containing an acrylic
ester unit, having an alicyclic group at an ester unit, or
a methacrylic ester unit, having an alicyclic group at an
ester unit, and an acrylic ester unit having a polar
structure at an ester unit or a methacrylic ester unit
having a polar structure at an ester unit;

coating a substrate to be processed with the resist,
and prebaking the substrate to be processed;

applying onto the resist a protecting film of a
hydrocarbon-based polymer, which is transparent to far
ultraviolet rays, and heating the same;

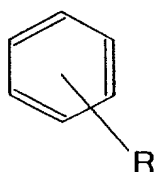
selectively exposing radiation to the resist on the
substrate to be processed;

postbaking the substrate to be processed; stripping

the protecting film; and

developing the resist on the substrate to be processed to form a desired resist pattern,

an application solvent for the hydrocarbon-based polymer of the protecting film being a non-aromatic hydrocarbon, or an aromatic hydrocarbon expressed by a general formula



(where R represents an alkyl group with 3 or more carbon atoms).

62. A method for forming a pattern comprising the steps of:

forming a resist of a radiation sensitive material according to claims 36;

coating a substrate-to-be-processed with the resist, and prebaking the substrate to be processed;

applying a protecting film of a hydrocarbon polymer, which is transparent to far ultraviolet rays, and heating the same;

selectively exposing radiation to the resist on the substrate to be processed, and postbaking the substrate to be processed; and

stripping the protecting film, and developing the resist on the substrate to be processed to form a desired resist pattern.

63. A method for forming a pattern according to claim 61, wherein an application solvent for the hydrocarbon polymer for the protecting film is limonene. 1,5-cyclooctadiene, 1-decene, t-butylcyclohexane, p-cymene or dodecylbenzene.

64. A method for forming a pattern according to claim 62, wherein an application solvent for the hydrocarbon polymer for the protecting film is limonene, 1,5-cyclooctadiene, 1-decene, t-butylcyclohexane, p-cymene or dodecylbenzene.

65. A method for forming a pattern according to claim 61, wherein

the hydrocarbon polymer is an olefine polymer or a diene polymer.

66. A method for forming a pattern according to claim 62, wherein

the hydrocarbon polymer is an olefine polymer or a diene polymer.

67. A method for forming a pattern according to claim 63, wherein

the hydrocarbon polymer is an olefine polymer or a diene polymer.

68. A method for forming a pattern according to claim 64, wherein

the hydrocarbon polymer is an olefine polymer or a diene polymer.

69. A method for forming a pattern according to claim 62, wherein

the substance having a polar-structure is ketone, alcohol, ether, ester, carbonic acid, an acid anhydride, or any one of these substances having a part of the atoms of a polar structure.

70. A semiconductor fabrication method comprising a step of patterning the resist by a method for forming a pattern according to claim 46.

71. A semiconductor fabrication method comprising a step of patterning the resist by a method for forming a pattern according to claim 61.